

MUNICIPAL RESPONSE (10/15/08)

Antidegradation Subgroup Homework Assignments

The purpose of these assignments is to provide IDEM with each interest group's positions on the antidegradation topics that were discussed by the subgroup at the first three subgroup meetings.

Assignment # 1:

Provide your suggested edits to the currently proposed applicability language of Section 1(b):

(b) Except as provided under section 4 of this rule, the antidegradation implementation procedures established by this rule apply to a proposed new or increased loading of a pollutant of concern to a surface water of the state that requires a new or modified NPDES permit. (Water Pollution Control Board; 327 IAC 2-1.3-1)

Remember, this language resulted from the discussion at the first subgroup meeting and was extensively reviewed at the second subgroup meeting. The review discussion did contemplate adding language to tie applicability to a "deliberative action". Please explain your reasoning for any proposed edits.

Assignment #1 Response:

As stated at the August 12th workgroup meeting, Municipal stakeholders will accept "new or increased loading of a pollutant of concern" contingent upon the final outcome of the "exceptions" in section 4. For the sake of clarity we also recommend that the provision be edited as provided above. If exceptions 1, 2, 3, 5, and 8 require justification or public notification above and beyond the existing regulatory framework, then Municipal stakeholders cannot accept antidegradation linked to new or increased loading of a POC. Please see the discussion for Assignment #3.

Assignment # 2:

Provide your suggested edits to the currently proposed definition of "pollutant of concern":

(45) "Pollutant of concern" means a pollutant that is reasonably expected to be present in a discharge based on the source and nature of the discharge.

Remember, this language resulted from the discussion at the first subgroup meeting and was extensively reviewed at the second subgroup meeting. The review discussion seemed to end with the group acceptance of this language as long as IDEM clarifies that the current IDEM

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“Form 2C” process is how IDEM plans to continue to identify pollutants of concern for determining what pollutants need to be addressed by a permit. Please explain your reasoning for any proposed edits.

Assignment #2 Response:

The discussions of the second workgroup meeting resulted in this language, which the Municipal stakeholders accept. There is some concern in tying the identification to “Form 2C”, which is used for the industrial permitting process. If it was understood, possibly by a non-rule policy, that the municipal permit application and the current priority pollutants list would be used for identifying POCs, then the concerns would go away.

Assignment # 3:

Complete the following table to identify your interest group’s position on the key policy issues related to the types of discharges or actions that may be “exempt” from an antidegradation demonstration.

Note: A couple of actions (reduction of air pollutants and alleviation of a public health concern) currently included in Section 6 of the draft rule are included in the table for evaluation. At the second subgroup meeting, the appropriate level of review for these types of actions was discussed.

Also note: The last rows allow for “proposed additions”. This is intended to capture your position on other types of discharges or actions that you may believe should also be “exempt” from an antidegradation demonstration. As discussed in the subgroup meetings, such discharges or actions included actions authorized under general permits, variances, etc. Please explain your reasoning for any proposed additional exemptions.

Assignment #3 Response:

Section in Draft Rule	Summary Description	Justification by Discharger Required?	Public Notice &/or Comment?	Simultaneous Guidance Document from IDEM?	Apply to BCCs?	Comments/Explanation
§4(b)(1)	Loading covered by permit	NO*	NO*	NO	YES	*covered by NPDES permit language
§4(b)(2)	Bypass	NO*	NO*	NO	YES	*covered by permit terms and

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						existing rules, 327IAC 2-2-8(11)
§4(b)(3)	New monitoring or limit	NO	NO	NO	YES	Notice provided by permit
§4(b)(4)	Pollutant in intake water	YES*	NO**	NO	YES	*data required to demonstrate that POC is in the intake waters **Notice via permit process
§4(b)(5)	Control on wet weather flow or storm water	NO*	NO**	NO Under development?	YES	*Municipalities: NO, if within current service area; Industry: NO, if controls are on contiguous property **,unless required elsewhere in the rules
§4(b)(6)	Short term and limited	YES*	YES*	NO	YES	*unless it falls under 4(b) (1), (2) or (5)
§4(b)(7)	CERCLA/RCRA actions	NO*	NO**	NO	YES***	* within existing approval process ** as required by existing approval process ***unless contradicted by other rules
§4(b)(8)	Increase in sewered area*	NO**	NO***	NO	YES#	*change “customer” to “user” **covered by existing rules, 327 IAC 3 ***unless contradicted by other rules #BCCs from sources other than industrial should be acceptable; suggest using language of in current rules 327 IAC 5-2-11.3(b)(1)(C)(iii)(FF)
§4(b)(9a)	Simultaneous decrease of same pollutant from another outfall of same facility into	NO*	NO*	NO	YES	*covered by permitting process

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	same waterbody					

§4(b)(9b)	Simultaneous decrease of same pollutant from same or another facility in watershed	YES	YES	NO	YES	
§4(b)(10)	Increase in pollutant A necessary to reduce more toxic pollutant B	YES	YES	NO	YES	
§4(b)(11)	Non-contact cooling water	YES*	YES*	NO	NO**	*within the existing process under the rules ** there should be no BCCs in non-contact cooling water, unless they are in the intake water, which is covered by 4(b)(4)
§4(b)(12)	Approved water treatment additives	NO* SEE COMMENTS	NO*	NO	NO**	*ONLY REQUIRED IF A NEW ADDITIVE PREVIOUSLY NOT APPROVED within the existing process under the rules **water additives with BCCs should not be approved unless 4(b)(10) applies
§6(c)(4)	Reduction of air pollutants	YES*	YES*	NO*	NO**	*within the existing process under the rules **water additives with BCCs should not be approved unless 4(b)(10) applies
§6(c)(5)	Sanitary wastewater alleviates public health concern	YES*	NO	NO	YES**	*Fast-tracked justification with reasons, including potential options, necessity, and agency sponsoring or requiring the new source. ** Only from non-industrial

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						sources.
Proposed addition						
Proposed addition						
Proposed addition						

Assignment # 4:

Provide your suggested definition of “assimilative capacity”. Currently, this term is not defined in the draft rule, but it is a critical concept that requires a common understanding by all who will apply antidegradation.

Assignment #4 Response:

The assimilative capacity is “the difference between the applicable water quality criterion for a pollutant parameter and the ambient water quality for that parameter when it is better than the criterion”, (*Memorandum from Ephraim S. King, Dir. of EPA Office of Science and Technology, to Water division directors, Regions 1-10, August 10, 2005*). In other words, if the applicable water quality criterion is X mg/l, and the ambient water quality of that pollutant is Y mg/l, then X must be greater than Y, and the assimilative capacity is (X-Y) mg/l. NOTE: mixing zones are not incorporated into the definition of assimilative capacity.

Assignment # 5:

Provide your suggested edits to the currently proposed de minimis language of Section 4(b)(13):

(13) A new or increased loading of a pollutant of concern that is a de minimis lowering of water quality determined according to the following:

(A) For a HWQ that is not an ONRW, OSRW or EUW, the following apply:

(i) Calculation considerations according to the following:

(AA) The proposed increase in mass-based effluent limits is less than or equal to the water quality-based effluent limit (WQBEL) calculated using ten percent (10%) of the unused loading capacity, or the DTBEL, whichever is more stringent.

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(BB) The unused loading capacity has not decreased by more than X percent (X%) above the benchmark set at the time of the initial antidegradation demonstration or de minimis evaluation in the area of the discharge.

When the WQBEL calculated using ten percent (10%) of the unused loading capacity is greater than the WQBEL based on the FAV, the WQBEL based on the FAV shall be used as the De minimis Water Quality Based Effluent Limit.

(ii) The proposed increase in mass discharged shall be determined as follows:

(AA) By using the equation of $M_p - ME = \text{proposed increase in mass discharged}$;

where: M_p = monthly average mass effluent limitation for the pollutant of concern in the proposed discharge;

and ME = monthly average mass effluent limitation for the pollutant of concern in the existing permit.

(BB) If the existing permit does not contain a monthly average mass effluent limitation for the parameter but does contain a weekly average or daily maximum mass limit, the existing weekly average or daily maximum permit limit shall be converted into a monthly average value to be used in the equation in subitem (AA).

(CC) If the existing permit does not contain a mass limit for the parameter but does contain a concentration limit, this concentration limit shall be converted into a mass value, using the discharge flow determined under 327 IAC 5-2-11.4(a)(9) value to be used in the equation in subitem (AA).

(DD) If the existing permit does not contain an effluent limit for the parameter, the actual monthly average mass discharged shall be used in the equation in subitem (AA).

(iii) For heat, the following conditions must be satisfied:

(AA) The new or increased discharge will not result in an increase in temperature in a stream or an inland lake, outside of the designated mixing zone, where applicable.

(BB) The new or increased discharge will not result in an increase in waste heat of an amount in a stream greater than the amount determined by calculating the number of British thermal units (BTUs) required to raise the temperature of the stream design flow of the receiving stream by one (1) degree Fahrenheit.

(B) For a HQW that is an OSRW or EUW, the following apply:

(i) Calculation considerations according to the following:

(AA) The proposed increase in mass-based effluent limits is less than or equal to the mass calculated using the new or increased flow and the water quality based effluent limitation (WQBEL) calculated without a mixing zone or the DTBEL, whichever is more stringent.

(BB) The unused loading has not decreased by more than X percent (X%) above the benchmark set at the time of the initial antidegradation demonstration or de minimis evaluation in the area of the discharge.

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(ii) The proposed increase in mass discharged shall be determined as follows:

(AA) By using the equation of $M_p - ME$ = proposed increase in mass discharged;

where: **M_p = monthly average mass effluent limitation for the pollutant of concern in the proposed discharge;**

and **ME = monthly average mass effluent limitation for the pollutant of concern in the existing permit.**

(BB) If the existing permit does not contain a monthly average mass effluent limitation for the parameter but does contain a weekly average or daily maximum mass limit, the existing weekly average or daily maximum permit limit shall be converted into a monthly average value to be used in the equation in subitem (AA).

(CC) If the existing permit does not contain a mass limit for the parameter but does contain a concentration limit, this concentration limit shall be converted into a mass value, using the discharge flow determined under 327 IAC 5-2-11.4(a)(9) to be used in the equation in subitem (AA).

(DD) If the existing permit does not contain an effluent limit for the parameter, the actual monthly average mass discharged shall be used to be used in the equation in subitem (AA).

(iii) Relative to temperature, the new or increased discharge will not result in an increase in temperature:

(AA) in a stream or an inland lake, outside of the designated mixing zone, where applicable; or

(BB) in Lake Michigan, as allowed in 327 IAC 2-1.5-8(c)(4)(D)(iv), at the edge of a one thousand (1,000) foot arc inscribed from a fixed point adjacent to the discharge.

(iv) Relative to heat, the new or increased discharge will not result in an increase in waste heat in an amount:

(AA) in a stream greater than the amount determined by calculating the number of BTUs required to raise the temperature of the stream design flow of the receiving stream by one (1) degree Fahrenheit; or

(BB) in Lake Michigan, greater than five-tenths (0.5) billion BTUs per hour.

The concept of de minimis was discussed at the third subgroup meeting. The discussion considered the following policy issues:

- Is 10% of the unused loading capacity the correct percentage for determining a de minimis discharge?
- What is the appropriate de minimis for an OSRW/EUW?
- Is the final acute value (FAV) the appropriate ceiling for a de minimis discharge?
- When calculating the de minimis, should the effluent flow be included, adding to the receiving stream's loading capacity?

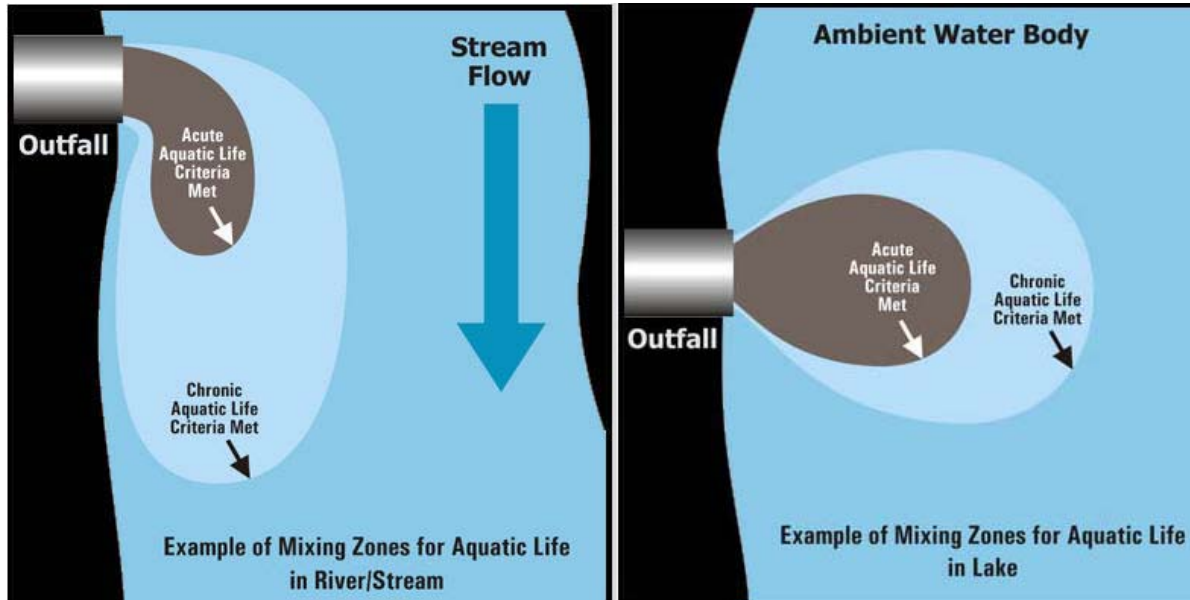
Please address these policy issues in your suggested edits and explain your reasoning for any proposed edits.

Assignment #5 Response:

Mixing Zones:

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The 1991 TSD for Water Quality –based Toxics Control defines a mixing zone as “an area where an effluent discharge undergoes initial dilution and is extended to cover the secondary mixing in the ambient waterbody. A mixing zone is an allocated impact zone where water quality criteria can be exceeded as long as acutely toxic conditions are prevented.” The two figures below (USEPA Website) show the two areas: the zone of initial dilution, where the acute toxicity is met at the boundary, but not within the zone; and the secondary zone, where the acute toxicity criterion is met, but the chronic toxicity is not met until the second boundary is reached.



A legal mixing zone is used to account for these areas in the calculation of total maximum daily loadings (TMDLs), waste load allocations (WLAs), and, where applicable, NPDES permit limits.

Assimilative Capacity:

The assimilative capacity is “the difference between the applicable water quality criterion for a pollutant parameter and the ambient water quality for that parameter when it is better than the criterion”, (Memorandum from Ephraim S. King, Dir. of EPA Office of Science and Technology, to Water division directors, Regions 1-10, August 10, 2005). In other words, if the applicable water quality criterion is X mg/l, and the ambient water quality of that pollutant is Y mg/l, then X must be greater than Y, and the assimilative capacity is (X-Y) mg/l. NOTE: mixing zones are not incorporated into the definition of assimilative capacity.

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de minimis Lowering of Water Quality:

From the Great Lakes Initiative SID and the King Memorandum (referenced above), a *de minimis* lowering cannot exceed 10 % of the unused assimilative capacity and a cap of the cumulative impacts of *de minimis* lowering must be no less than 10% of the total assimilative capacity for a pollutant of concern. Therefore, Municipal stakeholders recommend retaining 10% as the measure of *de minimis*. This would be true for ALL HQWs, including OSRWs and EUWs.

IDEM uses loading capacity rather than assimilative capacity, so these terms should be considered interchangeable.

Calculations:

Total Loading Capacity (TLC) equals the water quality criterion times the sum of the stream flow and effluent flow; from 11.3, $TLC = (WQS)(Q_s + Q_e)$

Used Loading Capacity (ULC) ideally is the sum of the loading in the design flow stream plus the concentration in the effluent permit limit (municipal permits) times the effluent design flow.

- We estimate the loading in the design flow stream from the background concentration and the stream design flow, IF the background concentration is upstream of the discharge.
- The discharge loading, the permit limit for the POC times the design flow for the discharge, must be added to the estimate of the loading in the design flow stream under those conditions.

Unused Loading Capacity = $TLC - ULC$

Maximum allowable *de minimis* lowering, under current GLS rules must ...

1. be less than 10% of Unused Loading Capacity; and
2. a minimum of 10% of the TLC must remain untouched.

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EXAMPLE:

Design Stream Flow (Qs):	5.0	mgd
Background Concentration of POC	0.005	mg/l
Water Quality Criterion for POC (CCC)	0.0213	mg/l
Water Quality Criterion for POC (CMC)	0.0384	mg/l
NPDES Average Monthly Limit (AML-Conc.)	0.0165	mg/l
NPDES Facility Design Flow (Qe)	10.0	mgd
Maximum <i>de minimis</i> as % of unused loading capacity	10%	
Cap on cumulative de minimis lowering	90%	(10% untouched TLC)

$$\begin{aligned}\text{Total Loading Capacity (TLC)} &= \text{CCC} * (\text{Qs} + \text{Qe}) * 8.34 \\ &= 0.0213 * (5.0 + 10.0) * 8.34 \\ &= 2.67 \text{ lb/day}\end{aligned}$$

$$\begin{aligned}\text{Used Loading Capacity (ULC)} &= (\text{Background} * \text{Qs} + \text{Eff Limit} * \text{Qe}) * 8.34 \\ &= (0.005 * 5.0 + .0165 * 10.0) * 8.34 \\ &= 1.58 \text{ lb/day}\end{aligned}$$

$$\begin{aligned}\text{Unused Loading Capacity (UNLC)} &= \text{TLC} - \text{ULC} \\ &= 2.67 - 1.58 \\ &= 1.09 \text{ lb/day}\end{aligned}$$

$$\begin{aligned}\text{Maximum } de \text{ minimis} &= \text{UNCL} * 10\% \\ &= 1.09 * 0.1 \\ &= 0.11 \text{ lb/day}\end{aligned}$$

$$\begin{aligned}\text{Remaining Unused Capacity} &= \text{UNLC} - de \text{ minimis} \\ &= 1.58 - 0.11 \\ &= 1.48 \text{ lb/day}\end{aligned}$$

$$\begin{aligned}\text{Remaining TLC} &= \text{UNLC}/\text{TLC} \\ (\text{must be } \geq 10\%) &= 1.48/2.67 \\ &= 92\% \text{ passes test}\end{aligned}$$

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Therefore, mass permit limits cannot increase above the *de minimis* mass calculated above. For example, if the facility desires to increase their effluent discharge by 5.0 MGD, then the effluent mass limit for the POC cannot exceed the current limit + the maximum de minimis value for the Average Monthly Limitation (AML), OR...

$$\begin{aligned}\text{AML (mass)} &= (0.016 * 10 * 8.34) + 0.012 \text{ lb/day} \\ &= 1.334 + 0.012 \text{ lb/day} \\ &= 1.346 \text{ lb/day}\end{aligned}$$

$$\begin{aligned}\text{AML (conc.)} &= 1.346 / (8.34 * \text{proposed effluent flow}) \\ &= 1.346 / (8.34 * 15) \\ &= 0.011 \text{ mg/l}\end{aligned}$$

NOTE: Permit limits are based on the most stringent long-term average (LTA) calculated in accordance with 327 IAC 5-2-11.6(c)(4).

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Is FAV the appropriate limit to de minimis?

NO, the maximum de minimis loading, when added to the existing mass permit limit and converted to a concentration limit, cannot exceed by exiting rule one of the following:

<u>Outside of Great Lakes System</u>		<u>Rule</u>
For acute toxicity:	FAV, in undiluted discharge	327 IAC 2-1-6(a)(1)(E)
	AAC, outside of zone of initial dilution	327 IAC 2-1-6(a)(1)(E)
For chronic toxicity:	CCC, outside zone of initial dilution	327, IAC 2-1-6(a)(2)
<u>Inside of Great Lakes System</u>		
For acute toxicity:	FAV, in undiluted discharge	327 IAC 2-1.5-8(b)(1)(E)
	CMC, outside of zone of initial dilution	327 IAC 2-1.5-8(b)(1)(E)
For chronic toxicity, depending on the applicable criterion:		
	CCC, HNC, HNV, HCC or HCV, outside zone of initial dilution	327 IAC 2-1.5-8(b)(2)
	WC, 30-day average	327 IAC 2-1.5-8(b)(2)

As seen above, FAV only applies to the undiluted discharge for acute toxicity consideration.

Should effluent flow be added in the de minimis calculation?

Yes, assuming the background concentration is upstream of the discharge (as should be the normal procedure). However, if the background concentration is measured downstream, then NO, because the existing effluent mass contribution is already accounted for.

Comments on DTBELs and an alternative:

Since no municipal permit examples of DTBELs or DTLs have been forthcoming, and it appears that IDEM has not formulated their policy regarding these values, it is impossible to comment or make a decision on the applicability to *de minimis*. The Municipal stakeholders require concrete examples, similar to the example above, where the math is easy to follow and reconstruct.